

Risk factors in outbreaks of legionellosis

- Water temperature between 20°C and 50°C
- Nutrients available for growth, such as proteins and rust
- Niches which will protect *Legionella* from heat and biocides, such as limescale and sludge
- Fine (invisible) aerosol such as that generated from taps, shower heads, cooling towers, and spray humidifiers
- Low water turnover—temperature may rise, biocides decay, and sediment precipitate to form a sludge
- Open to ingress of animals, insects, dirt, and sun—direct sunlight encourages algal growth
- Susceptible people exposed to aerosol—for example, those with impaired lung capacity or immune system

Recommended further reading

- Health and Safety Executive. *How to deal with SBS—Guidance for employers, building owners and building managers*. London: HMSO, 1995.
- Chartered Institution of Building Services Engineers. *Healthy workplaces*. Balham: CIBSE, 1993. (CIBSE GN2:1993.)
- Health and Safety Executive. *Display screen equipment work*. London: HMSO, 1992.
- Health and Safety Executive. *The prevention and control of legionellosis*. London: HMSO, 1991. (HS(G)70:1993.)

Prevention

Where there is a risk of legionellosis steps should be taken to ensure that equipment and systems are kept as clean as possible and regularly disinfected. If possible, water temperatures should be kept either below 20°C or above 50°C. If this is not possible biocides should be added to the water to prevent legionella bacteria multiplying, provided the biocides cannot enter the indoor air; thus, ongoing treatment of water is not possible with hot and cold water systems or spray humidifiers.

Guidance on the design and maintenance of these systems is given in the Health and Safety Executive's guidance note *The prevention and control of legionellosis*.

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Caring for Older People

Rehabilitation and older people

John Young



This is the 10th in a series of 14 articles edited by Eileen Burns, Neil Penn, and Graham Mulley

Rehabilitation is concerned with lessening the impact of disabling conditions. These are particularly common in older people and considerable health gain can be achieved by successful rehabilitation. Hospital doctors and general practitioners should be aware of the core principles of rehabilitation, be able to recognise rehabilitation need in their patients, and have sufficient knowledge of their local rehabilitation services to trigger the referral process.

In Britain, an estimated 4.3 million people over 60 are disabled—this represents 70% of all disabled people and 46% of all older people.¹ Most (over 90%) of older disabled people live in their own homes, and most (over 80%) have only "mild" disability, but many have several types of disability. Disability of all severity grades is strongly related to age, reflecting the increasing prevalence of the common disabling conditions: stroke, arthritis, cardiorespiratory diseases, fractured neck of femur, and peripheral vascular disease.

Rehabilitation is a complex set of processes usually involving several professional disciplines and aimed at improving the quality of life of older people facing daily living difficulties caused by chronic disease. The key purposes of rehabilitation can be summarised succinctly:

- Realisation potential
- Re-ablement
- Resettlement
- Role fulfilment
- Readjustment.

Rehabilitation "myths"

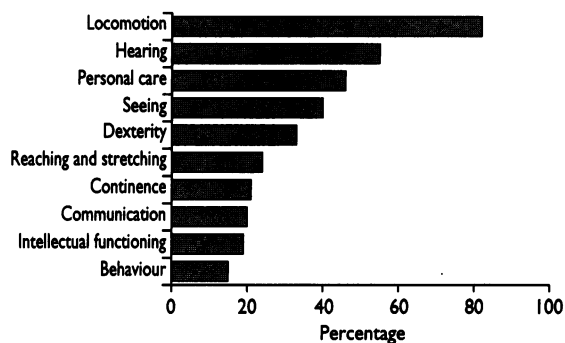
The process of rehabilitation is not always well understood. The commonest incorrect assumption is



"Portrait of a man in a red turban" (1433) by Jan van Eyck

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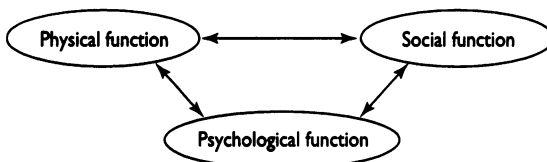


Frequency of types of disability in people over 75 living at home

that rehabilitation is time limited, with a clear end point, finishing when the patient leaves hospital. Many patients deteriorate through disease progression, inactivity, new illness, or after a fall, so regular review and reassessment is an important aspect of effective rehabilitation. Another common misunderstanding is that the patient is a passive recipient of a "treatment," as though the therapist were giving them a medicine. Rehabilitation is a highly energetic process in which the patient struggles against his or her disability with guidance from a rehabilitation team. It is not a "quick fix" but requires considerable patience and perseverance. Other myths are that rehabilitation is done only by "therapists" and can be done only in hospital departments; that it is appropriate only for people with mobility problems; that it is too expensive; and that it doesn't work.

Successful rehabilitation

It is easy for the rehabilitation process to focus predominantly on physical functioning. However, successful rehabilitation requires a broader perspective—one which allows social and psychological problems to be identified and addressed.

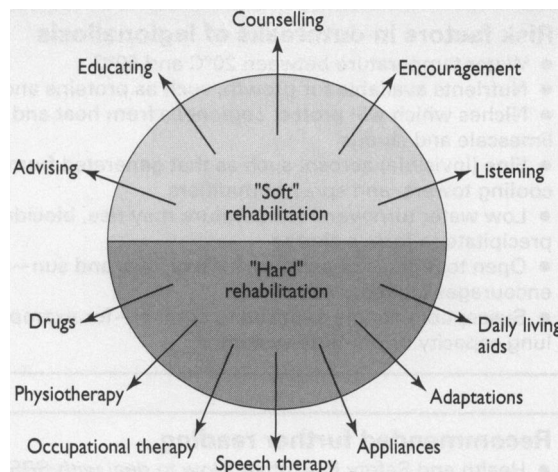


Holistic rehabilitation involves more than just physical function

Other success factors for rehabilitation are long established:

- A positive attitude and approach
- Individual assessment of patient and caregiver
- Involvement of patient and caregiver
- Team working
- Promotion of independence by:
 - Special and general therapeutic techniques
 - Optimising the environment

Several easily adopted practical approaches, described below, facilitate these factors and promote more successful rehabilitation outcomes. It is important to realise that rehabilitation involves several overlapping techniques which can be usefully separated into "hard" and "soft." Hard rehabilitation involves some form of "hands on" treatment by a range of rehabilitation staff. Soft rehabilitation is more easily overlooked but is often greatly valued by the patient. It involves talking to, listening to, understanding, and counselling the patient.



Common rehabilitation interventions

Some patients require only soft rehabilitation, but a special skill of rehabilitation is to optimise the balance between the two processes.

Assessment

The classification which has now been widely adopted as a framework to assess patients for rehabilitation is based on four levels: pathology, impairment, disability, and handicap.

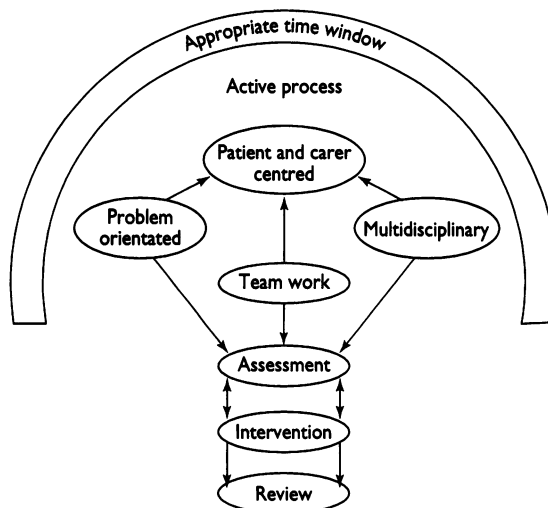
Pathology—abnormality of structure or function affecting an organ or organ system—for example, osteoarthritis, ischaemic heart disease.

Impairment—any loss or abnormality of psychological, physiological, or anatomical structure or function—for example, joint pain, breathlessness, muscle weakness, visual impairment, deafness.

Disability—any restriction or lack of ability to perform a task or activity—for example, walking, dressing, going up and down stairs, hearing.

Handicap—the disadvantages for a particular individual resulting from an impairment or disability that limits or prevents fulfilment of a role which is normal for someone of that age, sex or culture—for example, reading a newspaper, going to shops or the pub, gardening, attending a football match, playing the piano.

Doctors tend to be most familiar with uncovering pathologies and impairments ("the diagnosis"), but patients with chronic disease are often more concerned with the consequences of their disease (disability and handicap). Many common aspects of disability can be



Core concepts of rehabilitation

Barthel index

Bowels

- 0 Incontinent (or needs to be given enema)
- 1 Occasional accident (once a week)
- 2 Continent

Bladder

- 0 Incontinent, or catheterised and unable to manage alone
- 1 Occasional accident (maximum once per 24 hours)
- 2 Continent (for more than seven days)

Grooming

- 0 Needs help with personal care: face, hair, teeth, shaving
- 1 Independent (implements provided)

Toilet use

- 0 Dependent
- 1 Needs some help but can do something alone
- 2 Independent (on and off, wiping, dressing)

Feeding

- 0 Unable
- 1 Needs help in cutting, spreading butter, etc
- 2 Independent

Transfer

- 0 Unable—no sitting balance
- 1 Major help (physical, one or two people); can sit
- 2 Minor help (verbal or physical)
- 3 Independent

Mobility

- 0 Immobile
- 1 Wheelchair independent, including corners, etc
- 2 Walks with help (verbal or physical) of one person
- 3 Independent (but may use an aid)

Dressing

- 0 Dependent
- 1 Needs help but can do about half unaided
- 2 Independent (including buttons, zips, laces, etc)

Stairs

- 0 Unable
- 1 Needs help (verbal, physical, carrying aid)
- 2 Independent up and down

Bathing

- 0 Dependent
- 1 Independent (or in shower)

systematically detected by using the Barthel index (box). Handicap, the particular consequence of the impairments and disabilities to the individual, is best detected by asking open questions such as: "What would you like to be able to do that you cannot do now?" or "What is stopping you going outside?" (fear of falls, too many steps, etc) or "What do you find most frustrating?"

The Barthel index is now widely used in care of older people and rehabilitation departments. It assesses the level of independence or dependence for 10 activities of daily living with a score range of 0 (dependent) to 20 (independent). It is quick and easy to use, has been carefully researched, and aids systematic assessment of disability; when repeated at intervals it can indicate the progress of rehabilitation. The main disadvantages of the Barthel index are that it can be insensitive to change (patients may improve or deteriorate without a change in score) and that it has a low "ceiling" (patients may have a maximum score but still be restricted by inability to go out, cook, clean house, use the bus, etc). Despite these limitations, the Barthel index should be more widely used.

Strengths and weaknesses

Creating opportunities and maintaining a positive attitude is essential in rehabilitation. One simple technique is to consider a disability situation in terms of strengths and weaknesses. Consider a 77 year old man who has just suffered a hemiplegic stroke and lives with his wife. His strengths and weaknesses can be listed:

Strengths:

Wife as potential caregiver
Can sit unsupported
Can eat and drink
Continent
Alert
Previous good health
Ground floor flat

Weaknesses:

Unable to stand without help
Unable to walk even with help
Unable to dress himself
Apprehensive about future

When they are set out in this way, it is surprising how often the strengths predominate. They can then be used to address the weaknesses. For example, for this man, occupational therapy input for training in dressing (using the strengths of unsupported sitting balance and wife) and physiotherapy input to teach assisted transfers (using the strength of the wife as caregiver) would be a positive beginning to the rehabilitation process.

Goal setting

Explicit goal setting is a central task in the management of disabled elderly people. Goal setting should be informed by careful assessment of the patient and precede all rehabilitation interventions. Successful goals are recognised as being:

- Meaningful—appropriate to the problems and circumstances of the patient
- Agreed—consult and negotiate with patient, caregivers, and rehabilitation team
- Clearly communicated—write them down
- Realistic—challenging but achievable: not everyone can do everything.

A rehabilitation goal is not a vague statement (for example, "we will improve mobility") or a vague action ("we will refer to a physiotherapy department"). A rehabilitation goal is a precise statement and should be constructed so that its achievement is unambiguous.

Goal setting

Who	Mrs Smith	Mrs Brown
Will do what	Walk to her neighbours	Dress herself completely
Under what conditions	Using her Zimmer frame	Without help
To what degree of success	At least once per week	Before 8.30 each morning

Barriers to rehabilitation progress

Some patients may not make the amount of progress that was anticipated. Common reasons which should be considered are:

- Unidentified medical problems, such as anaemia, heart failure (fatigue syndrome), undiagnosed Parkinson's disease, undiagnosed hypothyroidism, or the side effects of drugs (especially postural hypotension)
- Occult depression—depression is commonly associated with physical disease in older people but is easily overlooked, and can have important consequences for the patient, who may benefit considerably from treatment with antidepressants
- Occult dementia—some patients will have well preserved social skills which mask loss of intellectual function; impairment of memory, concentration, perceptual skills, and apraxia are common in Alzheimer's disease and prevent full cooperation with rehabilitation techniques, many of which are complex learning tasks
- Communication problems—check vision (and spectacles); check hearing (and hearing aid).

Geriatric depression scale

1. Are you basically satisfied with your life? yes/NO
2. Have you dropped many of your activities and interests? YES/no
3. Do you feel that your life is empty? YES/no
4. Do you often get bored? YES/no
5. Are you in good spirits most of the time? yes/NO
6. Are you afraid that something bad is going to happen to you? YES/no
7. Do you feel happy most of the time? yes/NO
8. Do you often feel helpless? YES/no
9. Do you prefer to stay at home, rather than going out and doing new things? YES/no
10. Do you feel you have more problems with memory than most? YES/no
11. Do you think it is wonderful to be alive now? yes/NO
12. Do you feel pretty worthless the way you are now? YES/no
13. Do you feel full of energy? yes/NO
14. Do you feel that your situation is hopeless? YES/no
15. Do you think that most people are better off than you are? YES/no

Scoring: Answers indicating depression are in capitals. Each scores one point. Scores greater than 5 indicate probable depression.

Abbreviated mental test score

- 1 Age
- 2 Time (to nearest hour)
- 3 Address for recall at end of test—this should be repeated by the patient to ensure it has been heard correctly: 42 West Street
- 4 Year
- 5 Name of institution
- 6 Recognition of two people (doctor, nurse, etc)
- 7 Date of birth (day and month sufficient)
- 8 Year of first world war
- 9 Name of present monarch
- 10 Count backwards from 20 to 1

Scoring: Each correct answer scores one mark. A guide to rating cognitive function: 0-3 severe impairment; 4-7 moderate impairment; 8-10 normal.

Remember the caregivers

Caregivers have been addressed in an article earlier in this series.² Their contribution needs to be positively acknowledged by purposefully allocating time to understand their perspective and needs. "Knowledge is power"—information giving and contact with support groups are particularly valued. The caregiver may be depressed or anxious and need treatment, and routine discussion of respite care (day or night sitters, rotational care) is recommended.

Arranging rehabilitation for older people

The rehabilitation services are characterised nationally by wide variation in availability, type, scope, and content. Several agencies and several departments within these agencies are usually involved, so general practitioners and hospital doctors need to become familiar with their local arrangements. However, selection of patients for referral—and selection of an appropriate rehabilitation service—are practical issues for which guidance in general terms is important.

SELECTION OF PATIENTS

Older people with the following should be considered for referral:

- Disability but cause uncertain
- New impairment, disability, or handicap

Considerations for inpatient and outpatient rehabilitation

Inpatient rehabilitation

- High dependency/high care needs (especially night time care)
- Complex or multiple disability
- Rapid response needed
- Poor housing or unsuitable domestic circumstances
- No community rehabilitation available

Outpatient rehabilitation

- Low or modest dependency
- Less complex disability
- Slower response acceptable
- Appropriate housing and domestic circumstances

- Deterioration in existing impairment, disability, or handicap
- Strain on caregiver identified
- Barely coping: residential or nursing home care being considered
- New referral to home care service.

SELECTION OF A REHABILITATION SERVICE

Many older patients become disabled by an acute illness such as a major stroke, fractured neck of femur, or pneumonia and require emergency hospital admission for medical and rehabilitation care. For other patients, however, it may be less clear whether inpatient or outpatient rehabilitation is most appropriate. Discussion with a general physician or geriatrician, or a prior domiciliary assessment visit, may be helpful in such uncertain circumstances. Key aspects of the decision process are given in the box.

Outpatient rehabilitation can be organised by referral to an outpatient therapy department, a geriatric day hospital, or a home or community rehabilitation team. In general, clearly defined single problems (difficulty walking, difficulty bathing, etc) can be attended to in outpatient therapy departments but more complex or poorly defined problems, such as "not coping" or falls, are often best managed in a geriatric day hospital. However, care is needed in the referral process as some aspects of impairment and disability are clearly visible (such as knee pain and restricted mobility) but other aspects (such as being unable to do kitchen work) may

Equipment and services commonly required by older people disabled by osteoarthritis

<i>Equipment/service</i>	<i>Assessed by/provided by</i>
• Kitchen aids (tap turner, teapot tipper)	Social service occupational therapist
• Dressing aids (longhandled shoe horn)	Social service occupational therapist
• Pendant alarm	Social service area office
• Frozen meal provision	Home care service
• Walking frame	Physiotherapy service
• Outdoor wheelchair	Wheelchair service
• Ramp to front door	Social service occupational therapist and housing department
• High seat chair	Social service area office
• Raised toilet seat	Social service area office
• Extra stair rail	Social service area office
• Commode	Nursing loans
• Attendance allowance	Department of social services
• Day centre	Social worker
• Day hospital	Consultant geriatrician

be hidden. A full disclosure of all important aspects of disability in older people is often best undertaken by a rehabilitation team. This is most usually available via the day hospital.

It has been increasingly recognised that assessment and treatment of older people in their own home has advantages over departmental based assessments. Real daily life problems are more apparent; there is greater opportunity to involve the family; and there is greater opportunity to involve home care and community nursing staff. Some districts now provide separate home rehabilitation teams to achieve this, while in other districts the therapy team is based in the day hospital but much of the assessment and treatment takes place in the patient's home.

COORDINATION OF REHABILITATION

Coordination of effort between the members of a multidisciplinary rehabilitation team and between rehabilitation services is important but can be difficult to achieve. It should be easier in hospitals: elderly care wards, rehabilitation wards, stroke, and orthogeriatric units are structures which greatly facilitate team working and coordination between disciplines and agencies. It can be considerably more difficult outside the hospital as natural teams do not usually exist but need to be purposefully formed around individual patients. Consider the common situation of an elderly housebound woman disabled by osteoarthritis who wishes to remain in her terraced council house. A range of services and equipment is required, the access to which may defeat all but the most tenacious of rehabilitation staff. The box on the previous page provides an example.

Rehabilitation research

Although the research base for rehabilitation has expanded considerably, evidence for effectiveness remains patchy. There is evidence to support the general concepts of the rehabilitation process for older

Findings of studies of rehabilitation in the home

<i>Occupational therapy</i>	
Bathing aids	Improved independence
Simple aids	Improved independence
Rheumatoid arthritis	Improved independence
<i>Physiotherapy</i>	
Falls	Improved balance
Osteoarthritis	Less pain greater mobility
Stroke	Improved mobility and independence
Parkinson's disease	Improved mobility

people, for stroke units and some evidence to support orthogeriatric units. Several randomised trials of domiciliary rehabilitation have been undertaken with encouragingly positive results.

Perhaps the most surprising finding from the domiciliary rehabilitation studies is how little therapy input is required. Several of the studies used only two or three visits, yet the health gain for the patient was considerable, especially for interventions consisting of occupational therapy.

Further reading

Andrews K. *Rehabilitation of older adults*. London: Edward Arnold, 1987.

Squires A, ed. *Rehabilitation of the older patient*. London: Croom Helm, 1988.

Department of Social Security. *Elderly people in the community: their service needs*. London: HMSO, 1985.

1 Marten J, Meltzer H, Elliot D. The prevalence of disability among adults. London: HMSO, 1989. (OPCS surveys of disability in Great Britain: report 1.)

2 Travers A. Caring for older people: carers. *BMJ* 1996;313:482-6.

Lesson of the Week

Reversible cardiogenic shock complicating subarachnoid haemorrhage

Michael J A Parr, Simon R Finfer, Michael K Morgan

Patients with subarachnoid haemorrhage who develop profound cardiogenic shock should have aggressive intensive care as good recovery is likely

When rupture of a cerebral aneurysm results in cardiovascular collapse the prognosis may seem hopeless and active management may be withheld. We report five cases of aneurysmal subarachnoid haemorrhage associated with severe myocardial dysfunction and cardiogenic shock. Intensive treatment, including intravenous inotropes and intra-aortic balloon counterpulsation, resulted in good neurological and cardiovascular recovery.

Case reports

Case 1—A 41 year old woman was admitted following a collapse preceded by a headache. Her initial Glasgow coma scale score was 6 and she had a fixed dilated right pupil. On intubation of the trachea, frank pulmonary oedema issued from the tracheal tube, and the chest radiograph confirmed pulmonary oedema. A cranial computed tomogram showed subarachnoid haemorrhage and a right subdural haematoma (fig 1). She

immediately underwent evacuation of the subdural haematoma. After fluid resuscitation she required infusions of noradrenaline (1 µg/kg/minute), adrenaline (0.6 µg/kg/minute), and dobutamine (14 µg/kg/minute) to maintain adequate blood pressure. A pulmonary artery catheter was inserted and confirmed cardiogenic shock (table 1). The following day cerebral angiography showed an aneurysm of the pericallosal branch of the right anterior cerebral artery. An echocardiogram showed global impairment of left ventricular function. Estimated left ventricular ejection fraction was 25-30%; this deteriorated to 20% the following day. Mechanical ventilation and inotropic support were continued, and five days later the ejection fraction had improved to 40%. The aneurysm was clipped the following day, and she was discharged from intensive care seven days later. She remained in hospital for a further nine days and was then discharged to rehabilitation. At follow up, three

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